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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,642	08/29/2001	Shinichi Kawate	35.C15728	5606

5514 7590 10/09/2003

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EXAMINER

PERRY, ANTHONY T

ART UNIT PAPER NUMBER

2879

DATE MAILED: 10/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,642

Applicant(s)

KAWATE ET AL.

Examiner

Anthony T Perry

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-27,29 and 30 is/are rejected.
- 7) ☒ Claim(s) 1-15 and 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Drawings

Figures 13-14 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 1-15 are objected to because of the following informalities: in claim 1, line 10 and claim 2, line 2, "side wall" should be one word. Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims 12-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "said conductive layer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 4-10, 12, and 16-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Den et al. (JP 11-194134).

Regarding claims 1, 16, and 23-24, Fig. 8b of the Den reference discloses an electron emitting device comprising a negative electrode (first electrode) 81 and an extraction electrode (second electrode) 82 formed in opposition to each other with a gap between said extraction electrode and negative electrode on an electrically insulating substrate 80. A first layer 22 having a conductive front face of an oxide of Ti (see paragraph 0074) is formed on a surface of the negative electrode 81 between the first electrode 81 fibers 24 having a main component of carbon. The fibrous carbon 24 is grown from a catalyst particle 23 disposed on a sidewall surface of the first layer 22 on the extraction electrode side.

Regarding claims 2 and 27, Fig. 8 teaches only the sidewall surface of the first layer 22 on the extraction electrode 82 side being exposed and the other surfaces thereof covered with a second layer 83 on which a fibrous carbon 24 does not grow as compared with said first layer 22.

Regarding claim 4, Den teaches the fibrous carbon 24 being a carbon nanotube (see paragraph 0134).

Regarding claims 5-7 and 17-19, Den does not specify what type of carbon nanotube is used. However, since "nanotube" is a generic term, the teachings as disclosed in the Den reference encompass all types of nanotubes, including a nanotube that comprises a plurality of graphenes layered in an axis direction of the fibrous carbon.

Regarding claims 8 and 25, Den teaches a catalyst particle 23 consisting of Ni (see paragraph 0062).

Regarding claims 9 and 21, Fig. 8 shows an electron emission position from the fibrous carbon 24 is more distant from a surface of the substrate 80 than a position of a surface of the extraction electrode 82.

Regarding claims 10 and 22, Fig. 8 shows the extraction electrode 82 and negative electrode 81 are formed on a surface of substantially planar shape of the substrate 80 with the thickness of the negative electrode 81 being larger than a thickness of the extraction electrode 82.

Regarding claim 12, Fig. 8b show the first layer 22 on the negative electrode 81 inside of the gap between the extraction electrode 82 and the negative electrode 81 on a surface of the substrate 80.

Regarding claim 20, the recitation “wherein electrons are emitted by applying a voltage between said second electrode and said first electrode so that a potential of said second electrode is higher than that of the first electrode” has not been given patentable weight because it is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

Furthermore, the teachings of the Den reference cover the intended use recitation.

Regarding claim 26, the Den reference teaches the first layer being electrically conductive (see paragraph 0074).

Claims 16-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Choi et al. (US 66,605,894).

Regarding claim 16, Fig. 1 of the Choi reference shows an electron-emitting device comprising a first electrode 151 and a second electrode 160 in opposition to each other with a

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gap between the first and second electrode on a surface of the substrate 110. A plurality of fibers 130 are electrically connected to the first electrode 151 and comprise carbon as a main component. The fibers are placed on a surface of the first electrode through the use of a catalyst layer so as to be facing the second electrode.

Regarding claims 17-19, Choi does not specify what type of carbon nanotube is used. However, since "nanotube" is a generic term, the teachings as disclosed in the Choi reference encompass all types of nanotubes, including a nanotube that comprises a plurality of graphenes layered in an axis direction of the fibrous carbon.

Regarding claim 20, the recitation "wherein electrons are emitted by applying a voltage between said second electrode and said first electrode so that a potential of said second electrode is higher than that of the first electrode" has not been given patentable weight because it is considered an intended use recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

Furthermore, the teachings of the Choi reference cover the intended use recitation.

Regarding claim 21, Fig. 1 shows a height from the substrate surface to the fibers 130 being larger than a height from the substrate to a bottom surface of the second electrode 160.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11, 13-15 and 29-30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Den et al. (JP 11-194134).

Regarding claim 11, it is noted that the applicant's specific limitation of the substrate being thicker in a region where the negative electrode is formed, does not solve any of the stated problems or yield any unexpected result that is not within the scope of the teachings applied. Den teaches the negative electrode being thicker than the extraction electrode so that the carbon nanotubes are located at a sidewall of the negative electrode at a height above the top surface of the extraction electrode and the extraction electrode does not absorb the emitted electrons. Therefore it is considered to be a matter of choice, which a person of ordinary skill in the art would have found obvious to select any method of ensuring the height of the carbon nanotubes is greater than the extraction electrode, including having a thicker cathode electrode, increasing the thickness of the substrate at a position of the negative electrode, forming the negative electrode on top of an insulating layer, etc.

Regarding claims 13-14 and 29, Den does not specifically teach the use of the electron-emitting devices arrayed and connected to a matrix-wiring pattern. However, it is well known in the art to array such electron-emitting devices and to electrically connect them through the use of a matrix-wiring pattern so that each of the devices can be selected and driven to operate independently by means of a simple matrix wire arrangement instead of a complex wiring system having separate wires for each device. Accordingly, one of ordinary skill in the art at the time of the invention would have found it obvious to use such a matrix-wiring pattern in order to simplify the wiring step of an electron source.

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Regarding claims 15 and 30, Den teaches that the electron-emitting device can be used as the discharge element for an image-forming apparatus which inherently comprises a fluorescent member (see paragraph 0002). The image-forming member of such an image-forming apparatus for forming an image by collision of emitted electrons is inherently disposed at a position facing the electron source.

Allowable Subject Matter

Claims 3 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Regarding claims 3 and 28, the Den reference does not teach the material covering the first layer, where fibrous carbon does not grow being one of Ta, Cr, Au, Ag, Pt, or of a material making up the catalyst particle.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Lee et al. (US 6,541,906) teaches carbon nanotube emitters formed on the sidewall of a cathode electrode; Chen et al. (US 6,471,936) teaches different types of nanotube structures; and Yoshioka et al. (US 5,066,883) teaches a sidewall emitter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Anthony Perry* whose telephone number is (703) 305-1799. The examiner can normally be reached between the hours of 9:00AM to 5:30PM Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (703) 305-4794. The fax phone number for this Group is (703) 308-7382.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [Anthony.perry@uspto.gov].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Anthony Perry
Patent Examiner
Art Unit 2879
September 26, 2003



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